WHAT IS CLAIMED IS:

1. A refractometer comprising:

a linear scanned array comprising a plurality of photoelectric cells, each cell providing an output pulse during a scan having an amplitude determined by the amount of illumination of the corresponding cell by incident light;

optical means for directing light onto said array, the particular photoelectric cells of said array which are illuminated by said light being determined by the index of refraction of a sample substance placed in operative association with said optical means, wherein said optical means further acts to receive light reflected by said array and redirect said light reflected by said array back onto said array;

signal processing means connected to said linear scanned array for receiving and processing cell output pulses to compute the index of refraction of a sample substance placed in operative association with said optical means; and

a display connected to said signal processing means for reporting a result based on said index of refraction of said sample substance.

2. The refractometer according to claim 1, wherein said optical means includes a reflective surface near said array, said reflective surface having an end portion for receiving only said light reflected by said array.

3. The refractometer according to claim 1, wherein said reflective surface is at an angle of approximately fifteen degrees relative to said array.

4. The refractometer according to claim 1, wherein said optical means includes a prism having a sample surface for receiving said sample substance, and said array extends in a direction substantially parallel to said sample surface.

5. In an automatic refractometer having an array of photoelectric cells and optical means for directing light onto said array, the particular photoelectric cells of said array which are illuminated by said light being determined by the index of refraction of a sample substance placed in operative association with said optical means, the improvement comprising:

said optical means being configured and arranged with respect to said array to receive light reflected by said array and redirect said light reflected by said array back onto said array.

6. The improvement according to claim 5, wherein said optical means includes a reflective surface near said array, said reflective surface having an end portion for receiving only said light reflected by said array.

7. The improvement according to claim 5, wherein said reflective surface is at an angle of approximately fifteen degrees relative to said array.

8. The improvement according to claim 5, wherein said optical means includes a prism having a sample surface for receiving said sample substance, and said array extends in a direction substantially parallel to said sample surface.

9. In an automatic refractometer having a linear scanned array of photoelectric cells and optical means for directing light onto said array, the particular photoelectric cells of said array which are illuminated by said light being determined by the index of refraction of a sample substance placed in operative association with a sample-receiving surface of said optical means, the improvement comprising:

said linear scanned array extending in a direction substantially parallel to said sample-receiving surface.

10. A refractometer comprising:

a linear scanned array comprising a plurality of photoelectric cells, each cell providing an output pulse during a scan having an amplitude determined by the amount of illumination of the corresponding cell by incident light;

a prism having a sample surface for receiving a sample substance having a lower index of refraction than said prism;

means for providing non-parallel light obliquely incident upon a boundary between said sample surface and said sample substance;

a reflective surface orientated to define a primary illumination path from said boundary to said linear scanned array via said reflective surface and a secondary illumination path from said linear scanned array back to said linear scanned array via said reflective surface;

signal processing means connected to said linear scanned array for receiving and processing said output pulses to compute the index of refraction of said sample substance; and

a display connected to said signal processing means for reporting a result based on said index of refraction of said sample substance.

11. The refractometer according to claim 10, wherein said linear scanned array extends in a direction substantially parallel to said sample surface.

12. A refractometer comprising:

a housing having a sample well;

a prism mounted in said housing, said prism having a sample surface facing in an upward direction and accessible through said sample well for receiving a sample substance having a lower index of refraction than said prism;

means for providing non-parallel light obliquely incident upon a boundary between said sample surface and said sample substance;

a reflective surface mounted within said housing for receiving light after interaction at said boundary;

a linear scanned array mounted in said housing, said linear scanned array having a plurality of photoelectric cells facing in a downward direction and receiving light reflected by said reflective surface, each cell providing an output pulse during a scan having an amplitude determined by the amount of illumination of the corresponding cell by incident light;

signal processing means connected to said linear scanned array for receiving and processing said output pulses to compute the index of refraction of said sample substance; and

a display connected to said signal processing means for reporting a result based on said index of refraction of said sample substance.

13. In a refractometer having a prism including a sample surface for receiving a test sample to provide a critical angle boundary between said test sample, a light entry surface through which light travels to reach said critical angle boundary, and a light exit surface through which light travels after interaction at said critical angle boundary, the improvement comprising:

a lens fixed directly to said light entry surface for refracting illumination light to provide non-parallel rays obliquely incident at said critical angle boundary.

14. The improvement according to claim 13, wherein said lens includes a planar surface cemented to said light entry surface of said prism with optical cement.

15. The improvement according to claim 13, further comprising a second lens fixed directly to said light exit surface for refracting light traveling through said exit surface.

16. The improvement according to claim 15, wherein said second lens includes a planar surface cemented to said light exit surface of said prism with optical cement.